

**Chicken Tumours and a Fishy Revenge: Evidence for Emotional Content  
Bias in the Cumulative Recall of Urban Legends**

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## 20    **Abstract**

21           This study used urban legends to examine the effects of a cognitive bias  
22   for content which evokes higher levels of emotion on cumulative recall. As with  
23   previous research into content biases, a linear transmission chain design was used.  
24   One-hundred and twenty participants, aged 16-52, were asked to read and then  
25   recall urban legends that provoked both high levels and low levels of emotion and  
26   were both positively and negatively valenced. The product of this recall was  
27   presented to the next participant in a chain of three generations. A significant  
28   effect of emotion level on transmission fidelity was found with high emotion  
29   legends being recalled with significantly greater accuracy than low emotion  
30   legends. The emotional valence of a legend was found not to have any effect on  
31   cumulative recall; thus emotional biases in recall go beyond disgust and can  
32   incorporate other emotions such as amusement, interest and surprise. This study is  
33   the first to examine an emotion bias in cultural transmission as a general  
34   phenomenon without focusing on the emotion of disgust.

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## 42    **Introduction**

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44            Recently researchers have convincingly argued that the ability to acquire  
45    and transmit knowledge through social learning has been a powerful selective  
46    force in the evolution of human cognition (Hermann, Call, Hernández-Lloreda,  
47    Hare, & Tomasello, 2007; van Schaik & Burkart, 2011; Richerson & Boyd,  
48    2005). Reciprocally, it has been suggested that the ways in which information is  
49    processed and stored in the brain have a strong influence over the selection and  
50    modification of cultural traits that get passed on from person to person (Claidière  
51    & Sperber, 2007; Mesoudi & Whiten, 2008; Sperber, 1996). The positive  
52    influence of emotional arousal on the encoding and retrieval of memories in  
53    individual memory tests is well established (LaBar & Cabeza, 2006) but how this  
54    mnemonic advantage may translate to a content bias for emotional content in  
55    cultural transmission has received relatively little attention.

56            With regards to the effects of emotion on cultural transmission, previous  
57    research has focused on its influence on people's willingness to pass a story on (in  
58    Eriksson and Coultas' [2014] three phases of transmission, the stage defined by an  
59    individual's willingness to pass cultural information on is the 'choose-to-transmit'  
60    phase. The other two phases are 'choose-to-receive', based on an individual's  
61    willingness to receive cultural information and 'encode-and-retrieve', based on an  
62    individual's ability to encode the information to memory and later retrieve it).  
63    Heath, Bell and Sternberg (2001) propose that cultural items such as narratives  
64    undergo 'emotional selection', whereby concepts that trigger a stronger emotional  
65    response are positively selected for. To test this hypothesis they conducted two

66 studies using urban legends, focusing on the emotion of disgust. In their first  
67 study Heath et al. (2001) asked participants to read urban legends and to rate them  
68 for emotional, informational and story characteristics such as plot, characters,  
69 morals, practical information and plausibility, as well as their willingness to pass  
70 the story along to others. It was found that, while informational characteristics  
71 such as plausibility, were important in the likelihood of passing on a legend,  
72 legends were also more likely to be passed on if they elicited a greater level of  
73 disgust. In a second study, when the number and level of disgust evoking motifs  
74 in a legend were manipulated, participants preferred, and were more likely to pass  
75 on, legends which produced the highest level of disgust despite the fact that these  
76 stories were also less plausible and featured higher mean levels of other negative  
77 emotions such as anger and sadness. Heath et al. (2001) also found that urban  
78 legends which featured a greater number of disgust evoking motifs were more  
79 widely distributed on urban legend websites. They argue that urban legends are  
80 transmitted and retained in the social environment due to a positive selection for  
81 narratives that evoke stronger levels of emotion in general.

82 Another study by Peters, Kashima and Clark (2009) examined the effect  
83 of emotionality on the dissemination of social information. Participants were  
84 asked to read anecdotes then complete a questionnaire on how likely they would  
85 be to tell this anecdote to an unspecified audience, an audience of friends or an  
86 audience of strangers. They found that anecdotes which evoked medium to high  
87 levels of emotion were more likely to be passed on than anecdotes which evoked  
88 lower levels of emotion. Participants were also significantly more willing to pass

89 on anecdotes which evoked interest, disgust and happiness than sadness, fear and  
90 contempt to all three types of audience.

91         Other research suggests that it is the features of emotions rather than  
92 individual emotions themselves which enhances transmission. Berger and  
93 Milkman (2010) conducted an empirical analysis of 6,956 articles published over  
94 three months on the *New York Times* website. When controlling for external  
95 drivers of attention (position on the website etc.) and the emotions of surprise and  
96 interest, they found that articles which aroused emotions characterised by high  
97 arousal, such as anger, anxiety and awe were more likely to be forwarded via  
98 email than articles which evoked emotions characterised by low arousal, such as  
99 sadness. A survey of *New York Times* readers about their most recently shared  
100 article supported this finding (Berger & Milkman, 2010). No relation was found  
101 between disgust and how likely an article was to be shared but they suggest that  
102 this result is likely to be due to few of the news articles eliciting this emotion.  
103 Berger (2011) argues that this increased transmission is driven by the mobilising  
104 effect of an excitatory state and found a similar effect even when the arousal was  
105 incidental to the material being shared. Other studies have similarly found that  
106 increased emotional arousal increases the amount of sharing of information by  
107 participants (Christophe & Rimé, 1997; Luminet, Bouts, Delie & Manstead, 2000)  
108 but have not looked at the specific emotions involved.

109         Cultural transmission, however, does not just rely on people's willingness  
110 to pass a story on; in oral transmission at least, they must also encode and recall it.  
111 The cumulative effects of recall will have a particular influence over cultural  
112 transmission as only those elements which are preserved will be passed on to the

113 next generation. Eriksson and Coultas (2014) examined the role of cumulative  
114 recall in transmission by expanding on Heath et al. (2001). They introduced the  
115 concept of three distinct phases of cultural transmission: ‘choose-to-receive’,  
116 ‘encode-and-retrieve’ and ‘choose-to-transmit’. In a number of experiments using  
117 urban legends, they demonstrated that content evoking a high degree of disgust  
118 had a transmission advantage over content evoking a lower degree of disgust in all  
119 three phases. However, when looking at individual differences in willingness to  
120 pass along stories they found that positively valenced emotions (amusement,  
121 surprise) received higher ratings than negatively valenced emotions (anger,  
122 sadness, fear, disgust), suggesting that other emotions, particularly positively  
123 valenced ones, may be selected for to an even greater degree than disgust, at least  
124 in the ‘choose-to-transmit’ phase. While this study did demonstrate an advantage  
125 in cumulative recall for content which evoked higher levels of emotion (in their  
126 ‘encode-and-retrieve’ phase), like Heath et al (2001) it focused on the emotion of  
127 disgust.

#### 128 *The Present Research*

129 As in Heath et al. (2001) and Eriksson and Coultas (2014), real urban  
130 legends were used as a means to investigate emotional content biases. The study  
131 focused on urban legends because they represent culturally successful narratives  
132 from the real world and are also practical for use in experiments because they are  
133 relatively short and self-contained. Successful legends often share a number of  
134 features, such as a suspenseful or humorous narrative, which contains surprising  
135 information or a twist, a warning or moral message that is either explicit or

136 implied, and they are often attributed to a “friend of a friend” (Brunvand, 2000;  
137 Fox Tree & Weldon, 2007).

138           In contrast to the studies by Heath et al. (2001) and Eriksson and Coultas  
139 (2014), emotional content bias is investigated as a general phenomenon, rather  
140 than focusing on the single emotion of disgust, and the effects of emotion level on  
141 cumulative recall (the ‘encode-and-retrieve’ phase of transmission) are examined  
142 rather than either just the ‘choose-to-transmit’ phase or all three phases of  
143 transmission. Cumulative recall was chosen for examination as this can produce  
144 different results from individual recall, for example studies examining stereotype  
145 consistency bias have found that stereotype inconsistent (SI) information is  
146 recalled better than stereotype consistency (SC) bias at the individual level  
147 (Dijksterhuis and van Knippenberg, 1995; Macrae, Hewstone, & Griffiths,  
148 1993) but in cumulative recall stereotype consistent information is recalled better  
149 (Allport & Postman, 1947; Bangerter, 2000). Kashima (2000) found that, when  
150 remembering plot-relevant details, participants in earlier positions in a  
151 transmission chain recalled SI information better than SC information, however,  
152 SC information was retained better than SI information towards the end of the  
153 chain.

154           A transmission chain design is used, in which some form of information is  
155 passed from one participant to another in a linear ‘chain’ (as per the children’s  
156 game ‘Chinese Whispers’/‘Broken Telephone’). Transmission chain experiments  
157 are uniquely effective in uncovering content biases in transmission (Mesoudi et al,  
158 2006) and have been used successfully to investigate cognitive content biases,  
159 such as minimally counter-intuitive (MCI) bias (Barrett & Nyhof, 2001), a

160 hierarchical bias (Mesoudi & Whiten, 2004), a stereotype consistency bias  
161 (Kashima, 2000) and a social information bias (Mesoudi, Whiten & Dunbar,  
162 2006) as well as multiple biases occurring together (Stubbersfield, Tehrani &  
163 Flynn, 2015). In order to select appropriate material, seventeen urban legends  
164 were selected from the *Urban Legends Reference Pages* (www.snopes.com). The  
165 extent to which the legends evoked emotion was then rated by participants on a 7-  
166 point scale. Four legends were selected, two which scored high for evoking  
167 emotion and two which scored low. These legends evoked a range of emotions  
168 including disgust and amusement. This experiment aimed to test the hypothesis  
169 that emotional content bias is a general phenomenon and that legends that evoke  
170 higher levels of emotion will be recalled with higher fidelity along a transmission  
171 chain than legends that evoke lower levels of emotion, regardless of the emotion  
172 evoked. Individual recall-based experiments have shown a recall advantage for  
173 content which evokes high emotion across both positive and negative valences  
174 (LaBar & Cabeza, 2006) while transmission-based experiments have found  
175 differences between positive and negative valence in certain circumstances  
176 (Eriksson & Coultas, 2014; Peters et al., 2009) so here the effect of valence of  
177 cumulative recall is also examined.

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## 179 **Methods**

### 180 *Participants*

181 One-hundred and twenty participants (94 females) took part. Their ages  
182 ranged from 16 to 52 years with a mean age of 20.36 years (SD = 6.34). The



majority (92%) were undergraduate students studying psychology, education or recruited through opportunity sampling. Others were prospective students and parents attending a Psychology Department Open Day; all participants under the age of 18 took part with their parents' consent.

### *Design*

A linear transmission chain design was used. Each individual legend was transmitted along ten chains of three participants or 'generations', totalling forty chains for all four legends. Three generations was judged to be an optimum chain length, capable of capturing long-term cumulative effects of cultural transmission but short enough to be practical in terms of participant recruitment and has been used successfully in previous research (Barrett & Nyhof, 2001; Nielsen, Cucchiaro & Mohamedally, 2012; Stubbersfield et al., 2015). The first participant in each chain received a selection of legends which were counterbalanced so no legend appeared in the same position more than another legend. The next participant was presented with the material that had been recalled by the previous participant and so on, along the chain.

### *Material*

Before conducting the transmission chain study it was necessary to select appropriate legends. From a selection of seventeen original urban legends edited to match for word count and number of central propositions, two high emotion legends and two low emotion legends were selected. These legends are presented below:

206 1. Steroids in chicken cause ovarian cysts (low emotion)

207 *A woman underwent an operation to remove an ovarian cyst but just a*  
208 *few months later she relapsed and was rushed to her gynaecologist. The*  
209 *gynaecologist asked her if she often ate chicken wings, when she said yes*  
210 *he explained that, today, chickens are injected with steroids to accelerate*  
211 *growth. These steroids can have a terrifying effect on the body and are*  
212 *most dangerous in the presence of female hormones. Exposure to these*  
213 *steroids can lead to women being more prone to the growth of cysts in her*  
214 *womb.*

215 2. Woman has revenge on boyfriend with rotten fish in car (low emotion)

216 *A woman caught her boyfriend with another woman and decided to get*  
217 *revenge. She cut open the passenger seat of his car and hid fish inside*  
218 *before neatly re-stitching along the seam. As the fish rotted his car was*  
219 *filled with a terrible smell that he couldn't get rid of no matter what he*  
220 *did. He had no luck finding a new girlfriend because no woman would set*  
221 *foot in his car. He finally gave up and sold the car at a huge loss because*  
222 *of the horrible smell.*

223 3. Woman eats a tumour in a chicken burger (high emotion)

224 *A woman went into a takeaway and ordered a chicken burger but*  
225 *asked for it without mayonnaise. After leaving the restaurant she bit into*  
226 *the burger and discovered that there was mayonnaise in it after all, but*  
227 *she finished the burger anyway. Later that evening, she checked herself*  
228 *into the local hospital after falling violently ill with food poisoning. Her*

229           *stomach was pumped and the doctors discovered that the chicken in her*  
230           *burger had contained a tumour and that the sauce wasn't mayonnaise, it*  
231           *was pus from the tumour.*

232           4. Man suffers from flatulence at dinner party hosted by his girlfriend's  
233           parents (high emotion)

234           *A man was having dinner with his girlfriend's parents when he was*  
235           *suddenly gripped by terrible flatulence. He excused himself from the table*  
236           *and went in search of a toilet, however, he couldn't find one in time so*  
237           *instead he farted through an open window out of the parent's earshot.*  
238           *Much relieved, he returned to the table and continued the meal. Later, he*  
239           *asked his girlfriend how the night had gone, expecting a good response,*  
240           *however, she replied "it was going fine until you farted through the*  
241           *serving hatch!"*

242           Table 1 gives further detail about the legends used, such as their valence  
243           and the emotions they were said to evoke by participants. The legend selection  
244           was informed by questionnaire ratings from 106 participants on scales relevant to  
245           potential content biases such emotion, plausibility, survival information, social  
246           information and gender stereotyped behaviour. The ratings from this questionnaire  
247           allow for comparisons to be made between the legends in terms of content which  
248           may influence their recall and transmission. The high emotion legends were rated  
249           as evoking higher levels of emotion than the low emotion legends. Of the  
250           seventeen legends originally rated, Tumour-HN received the highest rating for

251 emotion and Dinner-HP was ranked 4<sup>th</sup>, Cyst-LN was ranked 12<sup>th</sup> and Fish-LP  
252 was ranked 16<sup>th</sup>.

253 In order to ensure that level of emotion was driving any differences in  
254 transmission of the legends, efforts were made to select legends that did not  
255 significantly vary on measures of potentially confounding content biases such as  
256 survival information, social information and gender stereotyped behaviour. The  
257 selected legends were successfully matched across the measures in most cases but  
258 there were some potentially confounding differences in content. Fish-LP and  
259 Dinner-HP both differed from Cyst-LN and Tumour-HN in survival information,  
260 social information and gender stereotypes but the effect of these differences were  
261 taken into account (see supplementary material for the mean differences between  
262 legends on these scores).

263 [Table 1 about here]

## 264 *Procedure*

265 Participants were asked to take part in a study regarding the cultural  
266 transmission of urban legends. Participants were individually presented with the  
267 experimental materials on a computer. They were asked to read the material and  
268 then, on a new page, type what they remembered of this material. No distracter  
269 task was performed and no time limit for recall was set. At no point during the  
270 procedure were participants told that the material had come from a previous  
271 participant or that their recall would be presented to another participant.

## 272 *Coding*

273           Following previous studies which used a linear transmission chain design  
274   (Bangerter, 2000; Kashima, 2000; Mesoudi, et al., 2006; Mesoudi & Whiten,  
275   2004; Stubbersfield et al, 2015), a propositional analysis (Kintsch, 1974) was  
276   performed on each participant's recall. This involves dividing the text into  
277   separate propositions. Only propositions central to the narrative were coded so as  
278   to avoid legends with more background details appearing to have poorer recall, as  
279   previous research has demonstrated that information relevant to the plot of a  
280   narrative is better recalled than background details (Kashima, 1997). This  
281   propositional analysis was used to calculate the percentage of original central  
282   propositions correctly recalled. Percentages were used instead of total number as  
283   the original texts varied between five and six central propositions. No significant  
284   difference in the percentage of central propositions recalled was found between  
285   legends with five central propositions and legends with six.

286           To assess coder reliability, an independent coder blind to the study  
287   hypothesis coded two chains of each legend (20% of all material). There was a  
288   significant correlation between the coding of the independent coder and the  
289   original coder ( $r_{24} = .88, p < .001$ ).

## 290   **Results**

291           A mixed 3x4 analysis of variance (ANOVA) was conducted with  
292   generation as a within subjects variable and legend as a between groups variable.  
293   There was a significant main effect of generation on the percentage of central  
294   propositions recalled ( $F_{2, 72} = 38.23, p < .001$ ). Planned contrasts revealed that  
295   recall quantity was significantly higher in generation 1 than generation 2 ( $F_{1, 36} =$

28.62,  $p < .001$ ) and higher in generation 2 than generation 3 ( $F_{1, 36} = 11.38$ ,  $p < .005$ ).

There was also a significant main effect of legend on the percentage of propositions recalled ( $F_{3, 36} = 22.87$ ,  $p < .001$ ). A Games-Howell *post hoc* test revealed that Tumour-HN and Dinner-HP both had significantly higher recall than Fish-LP and Cyst-LN ( $ps \leq .001$ ). No other significant results were found. Figure 1 shows the pattern of recall for each legend along the chains for each generation.

[Figure 1 about here]

A second mixed 3x2 ANOVA was conducted with generation as a within subjects variable and degree of emotion evoked (high vs. low) as a between groups variable. This revealed a significant main effect of generation as before ( $F_{2, 76} = 33.17$ ,  $p < .001$ ). Legends which evoked a higher degree of emotion showed a higher level of recall than legends which evoked a lower degree of emotion ( $F_{1, 38} = 56.97$ ,  $p < .001$ ). A third mixed 3x2 ANOVA was conducted with generation as a within subjects variable and emotional valence (positive vs. negative) as a between groups variable but no significant main effect of emotional valence was found ( $F_{1, 38} = 1.12$ ,  $p > .05$ ).

As some of the legends were not matched across potentially confounding content biases it is important to test for any effects this content may have had on recall. No significant correlations were found between the percentage of central propositions recalled and the social information score ( $M = 3.84$ ,  $SD = 1.67$ ) or the stereotype score ( $M = 3.73$ ,  $SD = 1.15$ ), both tests  $p > .05$ . However, a significant negative correlation was found between the percentage of central

propositions recalled and the survival information score ( $r = -.35$ ,  $n = 120$ ,  $p < .01$ ). In order to test how much effect the survival information score had on the percentage of central propositions recalled, a multiple regression was run to predict percentage of central propositions recalled from emotion level and survival information score. The regression model significantly predicted recall ( $F_{2, 117} = 68.87$ ,  $p < .01$ ,  $R^2 = .54$ , adjusted  $R^2 = .53$ ). Emotion level received the strongest weight in the model, explaining 41.6% of the unique variance compared to the survival information score which only predicted 2.79% of the unique variance. No significant age or gender effects were found.

## **Discussion**

The results of this study show that the urban legends which evoked higher levels of emotion in general were recalled with greater accuracy across a linear transmission chain than urban legends which evoked lower levels of emotion. This is consistent with previous research, which has demonstrated a cognitive bias for content which evokes higher levels of emotion (Berger & Milkman, 2010; Christophe & Rimé, 1997; Luminet, Bouts, Delie & Manstead, 2000). Importantly, however the emotional valence of an urban legend, positive or negative, was found to have no significant effect on cumulative recall. This is consistent with individual recall experiments where emotional arousal was found to enhance encoding and retrieval across both positive and negative valence (LaBar & Cabeza, 2006). Previous studies have found that participants were more willing to pass on stories which were positively valenced than negatively valenced, with the possible exception of when it is negatively valenced due to disgusting content (Eriksson & Coultas, 2014; Peters et al., 2009). The

343 transmission chain design presented here revealed that positive valence lends no  
344 advantage in the encode-and-retrieve phase of transmission, perhaps explaining  
345 why negatively valenced legends are so pervasive in the cultural environment.  
346 Future research should examine the differing levels of arousal of specific  
347 emotions in cultural transmission. If negatively valenced content is more likely to  
348 arouse strong emotions it could have an advantage at the encode-and-retrieve  
349 phase of transmission. Future research should also focus on the effects of positive  
350 or negative valence in the chose-to-receive phase and focus on examining the  
351 consumption of negatively valenced material.

352       Much of the existing research into emotional content bias in cultural  
353 transmission has focused on disgust (e.g. Eriksson & Coutlas, 2014; Heath et al.,  
354 2001; Nichols, 2002). For example, Nichols (2002) found that 16<sup>th</sup> century  
355 etiquette norms which prohibited disgust evoking actions were more likely to  
356 survive in the social environment than other etiquette norms. Similarly, Heath et  
357 al. (2001) found that participants preferred, and were more likely to pass on,  
358 legends which produced the highest level of disgust even though these stories  
359 were also less plausible and featured higher mean levels of other negative  
360 emotions such as anger and sadness. Heath et al. (2001) also found that urban  
361 legends which featured a greater number of disgust evoking motifs were more  
362 widely distributed on urban legend websites. Disgust does make an interesting  
363 case study when examining the role of emotional content in the cultural  
364 transmission of narrative, largely because of the question: why would people  
365 choose to receive or transmit content which is negatively valenced? However,  
366 disgust is somewhat uniquely affective as an emotion. It arouses powerful



367 behavioural responses and impacts on human society through our individual moral  
368 choices and public policy on issues such as health, justice, social exclusion and  
369 warfare (Curtis, 2011). This may make the findings of Nichols (2002) and Heath  
370 et al. (2001) more difficult to generalise to an overall bias for emotional content  
371 rather than a specific effect of disgust evoking content as it would be reasonable  
372 to expect disgust to be uniquely effective in cultural transmission compared to  
373 other emotions.

374         In this study, the emotion of disgust was shown to confer no particular  
375 advantage in transmission compared to other emotions at the encode-and-retrieve  
376 phase. The legend which featured disgusting content, Tumour-HN, was recalled  
377 with equal fidelity to an amusing legend, Dinner-HP, suggesting that the  
378 transmission fidelity was driven by the degree of emotion felt rather than the  
379 specific emotion evoked. This also suggests that disgust is not special in terms of  
380 cultural transmission and supports Heath et al.'s (2001) argument that emotional  
381 selection is a general bias. The emotions of interest and surprise were evoked by  
382 all the legends used in this study and in previous research they have been shown  
383 to grant a transmission advantage and increase the communicability of anecdotes  
384 (Peters et al., 2009). Both surprise and interest are unique in that they are fairly  
385 neutral in terms of valence but may add more to the effect of a narrative in terms  
386 of activation of the autonomic nervous system, a more surprising story would be  
387 more arousing and likely to be more memorable or transmissible (Berger, 2011;  
388 LaBar & Cabeza, 2006). The results of this study show no particular advantage to  
389 surprise or interest as the results were driven more by the degree of emotion  
390 evoked rather than specific emotions. Future research could examine how

391 different emotions combine: do neutrally valenced emotions like surprise bolster  
392 other emotions and increase their effectiveness?

393       Following previous research into emotional bias in cultural transmission  
394 (Eriksson & Coultas, 2014; Heath et al, 2001) but unlike previous research  
395 examining other biases in cultural transmission that has used original material (i.e.  
396 Mesoudi et al., 2006) this study used real urban legends. There are a number of  
397 benefits to using ‘real world’ material in such an experiment but this can come at  
398 the cost of full control over the features of the material. In this experiment efforts  
399 were made to control for any confounding variables in terms of content. As  
400 mentioned in the results section, survival information was found to be negatively  
401 correlated with recall. This contradicts previous research which has found an  
402 advantage for survival related information in recall (e.g. Nairne 2010; Nairne &  
403 Pandeirada, 2008; Stubbersfield et al, 2015). It is unclear why that would be the  
404 case here. The results of the regression show that the degree to which the legends  
405 were rated as containing survival information explained far less of the variance in  
406 the percentage of propositions recalled than the emotion level, suggesting that it is  
407 correct to attribute the variation in recall to the different levels of emotion.

408       The results suggest that in general terms, material which evokes greater  
409 levels of emotion will be more successful in cultural transmission due to an  
410 advantage in cumulative recall. It is expected that, for an urban legend to be  
411 successful over other urban legends in the social environment it must evoke a  
412 greater degree of emotion. This is supported by a content analysis of 254 urban  
413 legends, which found emotional content bias to be one of the most frequently  
414 coded biases, being found in the majority of legends, with all of the emotions

415 coded being characterised by high arousal (Stubbersfield, Tehrani & Flynn, under  
416 review). Emotional content is clearly a highly effective bias in the cultural  
417 transmission of urban legends.

418         While the aim of this study was to examine emotional content bias as a  
419 general phenomenon without focusing on a specific emotion, the range of  
420 emotions evoked by the urban legends used was still fairly narrow. The emotions  
421 are all characterised by high arousal for example. This is in part due to the use of  
422 urban legends as material as these narratives will tend to evoke more arousing  
423 emotions than some other narratives. Nevertheless, these results further support  
424 the argument that, urban legends provide a fruitful avenue for research into the  
425 effects of content biases on the cultural transmission and the evolution of  
426 narratives. Emotional content bias is clearly effective in transmission and research  
427 should look beyond the emotion of disgust to take into account other emotions  
428 and consider if the efficacy of the bias varies between emotions, the study  
429 presented here represents a significant step in that direction.

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436     **References**

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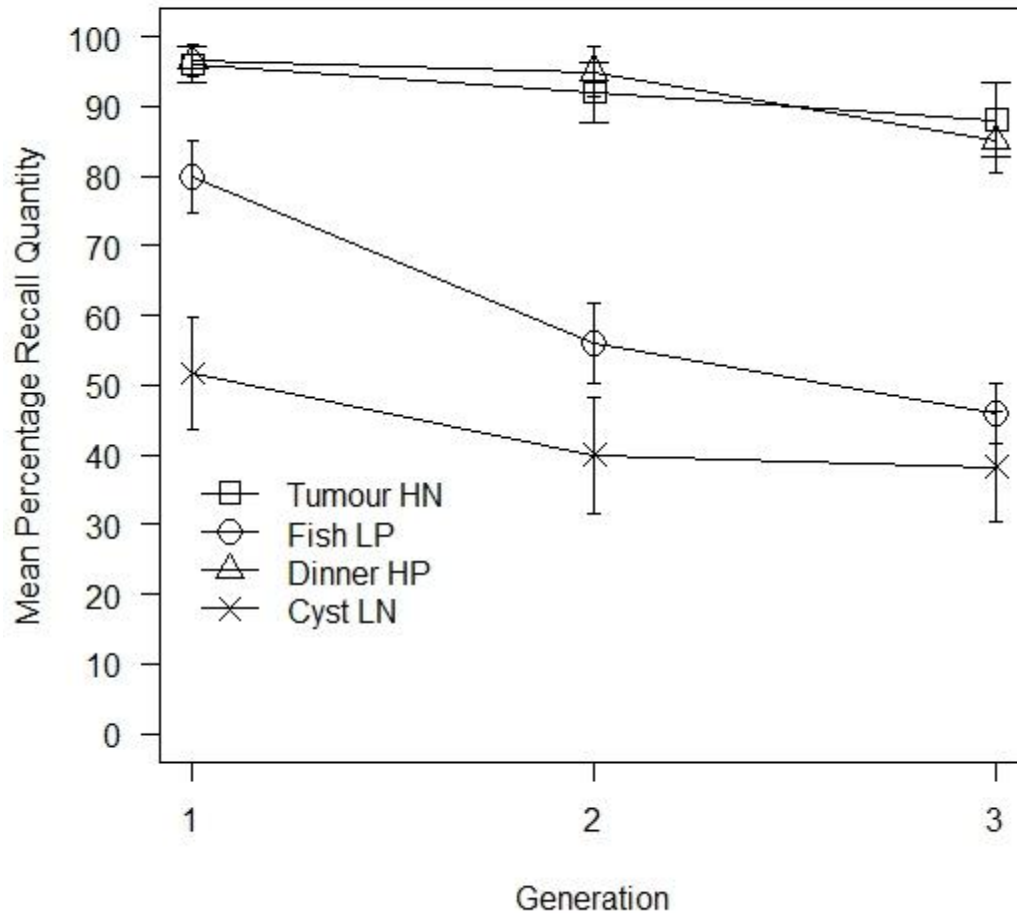
517 Table 1. *The legends used in this study with their respective emotion levels,*  
 518 *valence, two most frequently evoked emotions and code names.*

Legend	Emotion Level (Mean Score)	Valence	Emotions	Code Name
1. Steroids in chicken cause ovarian cysts	Low (5.5)	Negative*	Interest and Surprise	Cyst-LN
2. Woman has revenge on boyfriend with rotten fish in car.	Low (5)	Positive	Amusement and Interest	Fish-LP
3. Woman eats a tumour in a chicken burger.	High (6.5)	Negative	Disgust and Interest	Tumour-HN
4. Man farts in front of girlfriend's parents at a dinner party.	High (5.8)	Positive	Amusement and Surprise	Dinner-HP

519 \* Although interest and surprise were the most frequently evoked emotions by this  
 520 legend these can be positive or negative, it also evoked fear, concern and sadness and as  
 521 such was designated negatively valenced.

522





523

524 *Figure 1.* Mean percentage of original central propositions recalled by each  
 525 generation for each legend used in this study. Letter codes are used to indicate  
 526 emotion level and valence (corresponding with codes used in the article), with H  
 527 indicating 'high emotion', L indicating 'low emotion', P indicating positive valence  
 528 and N indicating negative valence. Error bars show standard error.

529

530

531 **Supplementary Material**

532

533 *Table showing the mean differences between the legends used in Chapter 4 (column –*

534 *row).*

	Cyst-LN (2)	Dinner-HP (3)	Fish-LP (4)
Tumour-HN	E 1.00	E .70	E 1.50
(1)	P .75	P 1.50	P .90
	G -.75	G -2.30*	G -2.85*
	S -.60	S -3.30*	S -3.85*
	V -.85	V 2.25*	V 1.75*
2		E -.30	E .50
		P .75	P .15
		G -1.55*	G -2.10*
		S -2.70*	S -3.25*
		V 3.10*	V 2.60*
3			E .80
			P -.60
			G -.55
			S -.55
			V -.50

535 \* Indicates legends are found in different subsets ( $p \leq .05$ )

536 Key:

537 E = Emotion score

S = Social information score

538 P = Plausibility score

V = Survival information score

539 G = Gender stereotype score

540